

# Carrageenan

**Brand Name:** Carraguard

## Drug Description

Carrageenan is a mixture of sulfated polysaccharides extracted from red seaweed (Rhodophyceae). The kappa and lambda forms of carrageenan are distinguished by the position of sulfate and the presence or absence of anhydrogalactose. Kappa carrageenans have a helical tertiary structure that allows gelling; lambda carrageenans are non-gelling. [1]

## HIV/AIDS-Related Uses

Carrageenan is being investigated as a topical microbicide to prevent the sexual transmission of HIV. A combined kappa and lambda carrageenan formulation comprises the active pharmaceutical ingredient in Carraguard, a vaginal gel being investigated in clinical trials.[2]

## Non-HIV/AIDS-Related Uses

Carrageenan is used as a gelling, emulsifying, and stabilizing agent and viscosity builder in foods and nonfoods, particularly in milk and water systems. Carrageenan compounds are on the FDA's list of GRAS (generally recognized as safe) products for consumption and topical application. Carrageenan is also used to induce edema in laboratory animals.[3]

Carrageenan is a potent in vitro inhibitor of herpes simplex virus, human cytomegalovirus, vesicular stomatitis virus, and Sindbis virus, in addition to HIV.[4]

## Pharmacology

Adhesion of HIV infected mononuclear cells to epithelia is an initial step in sexual transmission of HIV.[5] In vitro, carrageenan blocks adhesion of mononuclear cells to epithelia. Carrageenan also blocks cell trafficking of macrophages from the vagina to lymphoid organs.[6]

## Adverse Events/Toxicity

In Phase I clinical studies, carrageenan did not cause significant adverse effects and was not associated

with significant irritation of the female reproductive tract. Mild symptoms, including "bladder fullness," "genital warmth," and lower abdominal pain, were reported.[7] [8]

## Clinical Trials

For information on clinical trials that involve Carrageenan, visit the ClinicalTrials.gov web site at <http://www.clinicaltrials.gov>. In the Search box, enter: Carrageenan AND HIV Infections.

## Dosing Information

Mode of Delivery: Intravaginal gel.[9]

## Chemistry

CAS Number: 9000-07-1[10]

Solubility: Kappa form soluble in very polar solvents, hot milk, hot concentrated sugar solution, and water above 60 C. Lambda form soluble in very polar solvents, water, milk, hot concentrated sugar solution, and concentrated salt solution.[11]

## Other Names

PC-515[12]

Carrageenin[13]

Carragheen[14]

Chondrus[15]

Irish moss extract[16]

Carrageen[17]

Carrageenan gum[18]

## Further Reading

Perotti ME, Pirovano A, Phillips DM. Carrageenan formulation prevents macrophage trafficking from vagina: implications for microbicide development. *Biol Reprod.* 2003 Sep;69(3):933-9.

## **Further Reading (cont.)**

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Neurath AR, Strick N, Li YY. Anti-HIV-1 activity of anionic polymers: a comparative study of candidate microbicides. BMC Infect Dis. 2002 Nov 21;2(1):27.

Elias CJ, Coggins C, Alvarez F, Brache V, Fraser IS, Lacarra M, Lahteenmaki P, Massai R, Mishell DR Jr, Phillips DM, Salvatierra AM. Colposcopic evaluation of a vaginal gel formulation of iota-carrageenan. Contraception. 1997 Dec;56(6):387-9.

Pearce-Pratt R, Phillips DM. Sulfated polysaccharides inhibit lymphocyte-to-epithelial transmission of human immunodeficiency virus-1. Biol Reprod. 1996 Jan;54(1):173-82.

## **Manufacturer Information**

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## **For More Information**

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Contact your doctor or an AIDSinfo Health Information Specialist:

- Via Phone: 1-800-448-0440 Monday - Friday, 12:00 p.m. (Noon) - 5:00 p.m. ET
- Via Live Help: [http://aidsinfo.nih.gov/live\\_help](http://aidsinfo.nih.gov/live_help) Monday - Friday, 12:00 p.m. (Noon) - 4:00 p.m. ET

## References

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2. Population Council - Available at <http://www.popcouncil.org/biomed/carraguard.html>. Accessed 10/23/03.
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